

Yeo, et al.

Docket No.:

TSM03-0421

Serial No .:

10/608,287

Art Unit:

2891

Filed:

June 27, 2003

Examiner:

Chaudhari, Chandra P.

For:

Structure and Method for Forming the Gate Electrode in a Multiple-Gate

Transistor

Mail Stop Amendment Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Applicant wishes to bring to the attention of the Patent and Trademark Office the information noted on the enclosed form PTO/SB/08A & B that may be considered material to the examination of the above-identified application. Copies of the U.S. Patents cited are not being submitted. However, Applicant has included copies of the foreign patents and non-patent literature.

This Information Disclosure Statement is submitted under 37 C.F.R. §1.97(c) together with a \$180.00 fee under 37 C.F.R. §1.17(p) after the C.F.R. §1.97(b) time period, but before final action or notice of allowance, whichever occurs first. Please charge the required fee of \$180.00 and any additional amount, or credit any overpayment to Deposit Acct. No 50-1065 of the below mentioned firm. A duplicate copy of this sheet is enclosed.

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June 22, 2005

Date

Respectfully submitted,

Gregory T. Neugebauer Attorney for Applicant

Reg. No. 53,378

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Attorney Docket Number

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EN DEN ne Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. Complete if Known Substitute for form 1449A/PTO 10/608,287 **Application Number** INFORMATION DISCLOSURE Filing Date June 27, 2003 STATEMENT BY APPLICANT **First Named Inventor** Yeo, et al. Art Unit 2891 (Use as many sheets as necessary) **Examiner Name** Chaudhari, Chandra P.

Sheet

			U.S. PATENT	DOCUMENTS	
Examiner Initials*	Cite No.1			Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant
	1	US-4,933,298	06-12-1990	Hasegawa	Figures Appear
	2	US-4,946,799	08-07-1990	Blake et al.	
	3	US-5,317,175	05-31-1994	Throngnumachai	
	4	US-5,317,178	05-31-1994	Wu	
	5	US-5,464,783	11-07-1995	Kim et al.	
	6	US-5,607,865	03-04-1997	Choi et al.	
	7	US-5,814,895	09-29-1998	Hirayama	
	8	US-5,998,852	12-07-1999	Berry et al.	
	9	US-6,114,725	09-05-2000	Furukawa et al.	
	10	US-6,157,061	12-05-2000	Kawata	
	11	US-6,222,234 B1	04-24-2001	Imai	
·	12	US-6,300,182 B1	10-09-2001	Yu	
-	13	US-6,342,410 B1	01-29-2002	Yu	
	14	US-2002/0011612 A1	01-31-2002	Hieda	
	15	US-6,344,392 B1	02-05-2002	Liaw	
	16	US-6,380,024 B1	04-30-2002	Liaw	
	17	US-6,387,739 B1	05-14-2002	Smith, III	
	18	US-6,391,796 B1	05-21-2002	Akiyama et al.	
	19	US-6,411,725 B1	06-25-2002	Rhoads	
	20	US-6,475,869 B1	11-05-2002	Yu	

	FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No.1	Foreign Patent Document Country Code ³ - Number ⁴ - Kind Code ⁵ (<i>if known</i>)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶			
	21	JP 02-015675	01-19-1990	Fujitsu LTD		1			
	22	FR 2 617 642	01-06-1989	Thomson Semiconducteurs					
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Complete if Known Substitute for form 1449A/PTO 10/608,287 **Application Number** INFORMATION DISCLOSURE Filing Date June 27, 2003 STATEMENT BY APPLICANT First Named Inventor Yeo, et al. Art Unit 2891 (Use as many sheets as necessary) **Examiner Name** Chaudhari, Chandra P. Sheet 4 Attorney Docket Number TSM03-0421

			U.S. PATENT	DOCUMENTS		
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Initials*	No. ¹	Number - Kind Code ^{2 (if known)}	MM-DD-YYYY	Applicant of Cited Document	Relevant Passages or Relevant Figures Appear	
	23	US-6,475,890 B1	11-05-2002	Yu		
	24	US-6,476,437 B2	11-05-2002	Liaw		
	25	US-2003/0011080 A1	01-16-2003	Deshpande et al.		
	26	US-6,514,808 B1	02-04-2003	Samavedam et al.		
	27	US-6,521,949 B2	02-18-2003	Assaderaghi et al.		
	28	US-2003/0042528 A1	03-06-2003	Forbes		
	29	US-6,534,807 B2	03-18-2003	Mandelman et al.		
	30	US-6,573,549 B1	06-03-2003	Deng et al.		
	31	US-2003/0111678 A1	06-19-2003	Colombo et al.		
	32	US-2003/0113970 A1	06-19-2003	Fried et al.		
	33	US-6,596,599 B1	07-22-2003	Guo		
	34	US-6,605,514 B1	08-12-2003	Tabery et al.		
	35	US-6,611,029 B1	08-26-2003	Ahmed et al.		
	36	US-6,617,210 B1	09-09-2003	Chau et al.		
	37	US-2003/0178670 A1	09-25-2003	Fried et al.		
	38	US-6,635,909 B2	10-21-2003	Clark et al.		
	39	US-6,642,090 B1	11-04-2003	Fried et al.		
	40	US-2004/0007715 A1	01-15-2004	Webb et al.		
	41	US-2004/0031979 A1	02-19-2004	Lochtefeld et al.		
	42	US-2004/0038464 A1	02-26-2004	Fried et al.		
	43	US-6,706,571 B1	03-16-2004	Yu et al.		
	44	US-2004/0061178 A1	04-01-2004	Lin et al.		
	45	US-6,720,231 B2	04-13-2004	Fried et al.		
	46	US-2004/0075122 A1	04-22-2004	Lin et al.		
	47	US-2004/0119100 A1	06-24-2004	Nowak et al.		
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INF	ORMATION	DISCL	OSURE	Filing Date	June 27, 2003	
	ATEMENT B			First Named Inventor	Yeo, et al.	
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Sheet	3	of	4	Attorney Docket Number	TSM03-0421	

	,	NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T²
	48	AUTH, C.P., et al., "Scaling Theory for Cylindrical, Fully-Depleted, Surrounding-Gate MOSFET's," IEEE Electron Device Letters, Vol. 18, No. 2 (February 1997) pp. 74-76.	
	49	CELIK, M., et al., "A 45 nm Gate Length High Performance SOI Transistor for 100nm CMOS Technology Applications," Symposium on VLSI Technology Digest of Technical Papers (2002) pp. 166-167.	
	50	CHAU, R., et al., "A 50nm Depleted-Substrate CMOS Transistor (DST)," IEDM (2001) pp. 621-624.	
	51	CHEN, W., et al., "Suppression of the SOI Floating-Body Effects by Linked-Body Device Structure," Symposium on VLSI Technology Digest of Technical Papers (1996) pp. 92-93.	
	52	FUNG, S.K.H., et al., "Gate Length Scaling Accelerated to 30nm Regime Using Ultra-Thin FIlm PD-SOI Technology," IEDM (2001) pp. 629-632.	
	53	GEPPERT, L., "The Amazing Vanishing Transistor Act," IEEE Spectrum (October 2002) pp. 28-33.	
	54	KRANTI, A., et al., "Design Guidelines of Vertical Surrounding Gate (VSG) MOSFETs for Future ULSI Circuit Applications," IEEE (2001) pp. 161-165.	
	55	JE, M., et al., "Quantized Conductance of a Gate-All-Around Silicon Quantum Wire Transistor," Microprocesses and Nanotechnology Conference (1998) pp. 150-151.	
:	56	NEMATI, F., et al., "A Novel Thyristor-Based SRAM Cell (T-RAM) for High-Speed, Low-Voltage, Giga-Scale Memories," IEDM (1999) pp. 283-286.	
	57	NITAYAMA, A., et al., "Multi-Pillar Surrounding Gate Transistor (M-SGT) for Compact and High-Speed Circuits," IEEE Transactions on Electron Devices, Vol. 38, No. 3 (March 1991) pp. 579-583.	
	58	OH, S-H., et al., "Analytic Description of Short-Channel Effects in Fully-Depleted Double-Gate and Cylindrical, Surrounding-Gate MOSFETs," IEEE Electron Device Letters, Vol. 21, No. 9 (September 2000) pp. 445-447.	

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	59	SATO, N., et al., "Hydrogen Annealed Silicon-On-Insulator," Appl. Phys. Lett., Vol. 65, No. 15 (October 10, 1994) pp. 1924-1926.	
	60	SHAHIDI, G.G., "SOI Technology for the GHz Era," IBM J. RES. & DEV., Vol. 46, No. 2/3 (March/May 2002) pp. 121-131.	
,	61	TANG, S.H., et al., "FinFET - A Quasi-Planar Double-Gate MOSFET," IEEE International Solid-State Circuits Conference (2001) pp. 118-119 & 437.	
	62	YAMAGATA, K., et al., "Selective Growth of Si Crystals from the Agglomerated Si Seeds over Amorphous Substrates," Appl. Phys. Lett., Vol. 61, No. 21 (November 23, 1992) pp. 2557-2559.	

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